

IN THE CLAIMS:

Amend the claims of the application as set forth below:

Claims

1. (Canceled)

2. (Canceled)

~~3. (currently amended)-3. On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 1, characterized in that it comprising[[es]]:

[[-]] means ~~of~~ for pumping and circulating (9) the substance to be controlled from a bioreactor or similar source (2) to a first test-tube (3),

[[-]] a second test-tube (4) in which a static control sample of the substance (1) to be controlled is placed,

[[-]] means ~~of~~ for emitting light of a variable intensity (5) and pre-set range of frequencies that are applied to the first test-tube (3),

[[-]] means ~~of~~ for emitting light of a constant intensity (6) and in the same said frequency range ~~mentioned in the immediately preceding paragraph~~, which are applied to the second test-tube (4),

[[-]] means ~~of~~ for sensing (7) the light which passes through the first test-tube (3) and providing a first signal in accordance with the light intensity sensed,

[[-]] means ~~of~~ for sensing (8) the light which passes through the second test-tube and providing a second signal in accordance with the light intensity sensed (4),

[[-]] means ~~of~~ for comparing (10) the ~~two~~ said first and second signals corresponding to the light intensities sensed by the ~~above-mentioned~~ said sensing means and providing an output signal in accordance with the intensity difference (7,8),

[[-]] means for adjusting (11) the said output signal, such that by means of the modification of the power applied to the light-emitting means (5), the difference between the two said output signals of the sensing means (7,8) will be nil or, equivalently, that the output signal of the ~~aforementioned~~ means of comparison (10) will be nil,

[[-]] means for varying the power (12) applied to the means of emitting light of variable intensity (5) in terms of the output signal of the means of adjustment (11),

[[-]] means for sensing and transmitting (13) the instant value of the signal which is being applied to the means of emitting variable intensity light (5),

[[-]] and means for processing (14) the output signals of the aforementioned sensing and transmitting means (13), and for calculating [[=]] in terms of the output signal and of a

calibration pattern [-] the parameter of interest of the aforementioned said substance (1).

4. (currently amended) ~~On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein claim 3, ~~characterized in that~~ said light-emitting means (5,6) consist of LED diodes which emit at wavelengths within the visible or infrared spectrum and the light-sensing means (7,8) consist of silicon photodiodes.

5. (currently amended) ~~On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes as per claim 3, comprising 3, ~~characterized in that it has~~ means for eliminating any possible cases of interference caused by gas bubbles or other particles.

6. (currently amended) ~~On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 5, wherein 5, ~~characterized in that~~ said means of eliminating any interference consist of an air valve which is located downstream from the first test-tube (3).

7. (currently amended) ~~On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 55 hereinabove, ~~characterized in that~~ wherein said means of eliminating any possible cases of interference consist of ~~the use of~~ a filtering algorithm which is integrated into the processing means (14).

8. (currently amended) ~~On-line method and e~~Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3, ~~characterized in that~~ said pumping and circulating means (9) consist of a hydraulic pump with ~~the a~~ a suitable pipage.

9. (currently amended) ~~On-line method and e~~ Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3 ~~hereinabove, characterized due to the fact that~~ said test-tubes (3,4) are of a sturdy materials with a low light absorption index at the wavelengths emitted by the light-emitting means (5,6).

10. (currently amended) ~~On-line method and e~~ Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3, ~~characterized in that~~ the two test-tubes (3,4) are located in one same compartment, such that the temperature inside these test-tubes will be the same for the purpose of preventing any drift effects due to temperature changes.

11. (currently amended) ~~On-line method and e~~ equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3, ~~characterized in that~~ the means of adjustment (11) consist of a PI controller ~~an IP-adjuster~~.

12. (currently amended) ~~On-line method and e~~ Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3, ~~characterized in that~~ the ~~aforementioned~~ means of processing and calculation (14) are subject to being recalibrated by means of the comparison of the results provided thereby and the occasional analysis of the aforementioned substance (1).

13. (currently amended) ~~On-line method and e~~ Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the spectrum during the development of biotechnological processes, as per claim 3, wherein 3, ~~characterized due in that~~ the ~~aforementioned~~ means of varying the power (12) consist of a voltage-intensity converter.

14. (currently amended) ~~On-line method and e~~ Equipment for detecting, determining the evolution and quantifying a microbial mass and other substances that absorb light along the

spectrum during the development of biotechnological processes, as per claim 3, wherein 3;
~~characterized in that~~ the aforementioned means of processing and calculation (14) functionally
include a reading data block (15) followed by the filtering block (16) and an estimating block
(17) which calculates the concentration of substances of interest based on a mathematical model
and which is connected to a recalibration block (18) and to a results display block (19), it also
being possible for an optional control block to be incorporated, affording the possibility of
obtaining the instant value of the flow of the substrate to the bioreactor (2), thus optimizing the
production of biomass or substance of interest.